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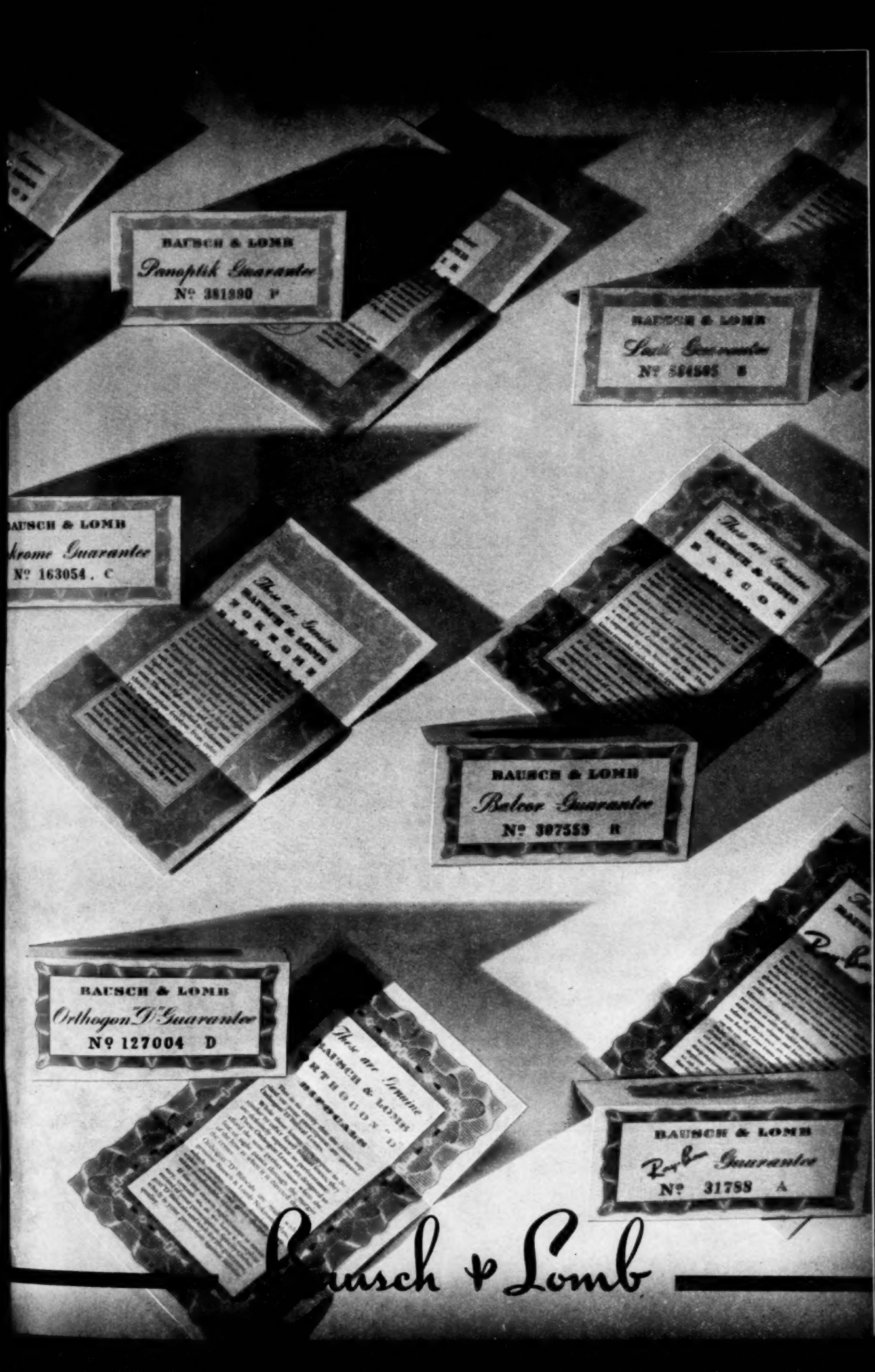
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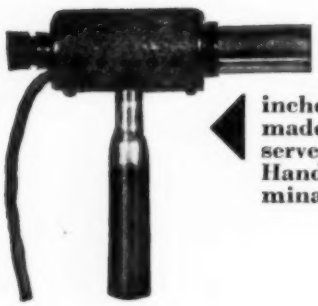

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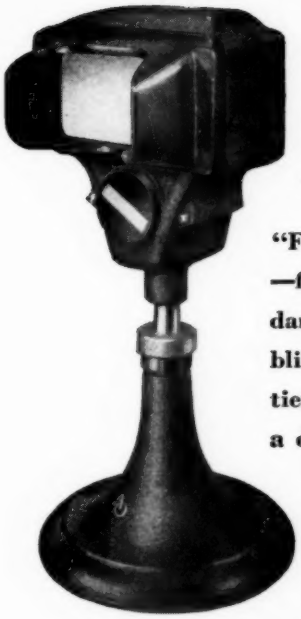

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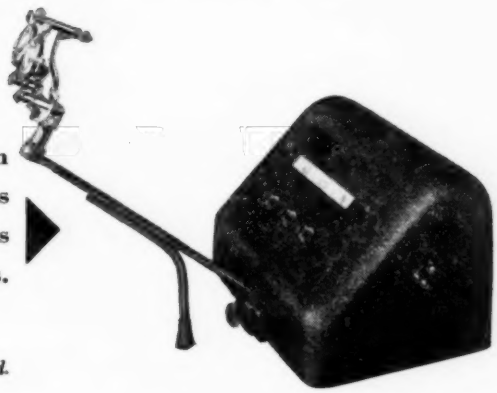

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AMERICAN JOURNAL OF OPTOMETRY

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DR. VERHOEFF AND ANOMALOUS PROJECTION*

Frederick W. Brock, Opt.D.
New York City, N. Y.

During a recent personal discussion between Dr. Verhoeff and the writer, regarding methods of treating alternate squinters along the lines outlined in my recent article in this journal,[1] Dr. Verhoeff took objection to the fact that I had failed to point out that credit belongs to him for the suggestion that "presumably the most effective way to develop binocular fixation in a case of convergent strabismus would be for the squinter frequently to observe a suitable object moved slowly forward and backward in the vicinity of the crossing point."[2] Dr. Verhoeff came to this conclusion because he believed that "in cases of anomalous projection without amblyopia, two images, one on each fovea, are projected under certain conditions to the same place, the crossing point of the primary visual axes, and under other conditions to two different places separated laterally in space." Undoubtedly the fact that "in almost all cases of convergent strabismus, when the visual acuity is good in each eye, replacement, apparently identical with normal incomplete replacement, can be demonstrated when a suitable object is at the crossing point of the primary visual axes" was primarily responsible for this viewpoint.

Following this suggestion, I experimented with anomalous projectors along these lines but found to my dismay that in all instances where bi-macular fixation could be elicited at the crossing-point, the patient invariably had the sensation of seeing two identical objects laterally more or less separated and that this separation did not vary materially in the same patient.

These results being decidedly at variance with Dr. Verhoeff's expectations, I proceeded to investigate this claim further with the aid of the

*Submitted for publication August 15, 1939.

1. Brock, F. W., Anomalous Projection in Squint. Am. J. Optometry Vol. 16-6.
2. Verhoeff, F. H., Vision Phenomena and Strabismus. Arch. Opth. Vol. 19-5, Page 695.

Anomoscope described in my previous article.[3] The findings proved conclusively that Dr. Verhoeff's expectations had no substance in fact and that anomalous projectors cannot perceive a single object lying at the crossing point of their primary visual axes as a single object if the stimuli of both retinae are permitted to reach consciousness. The reason for this is evident if one considers, what I have pointed out in my last article, that the unified visual perception in anomalous projectors is along two divergent primary visual axes, both in convergent and divergent squint, and that these axes never intersect each other save at the primary (anterior) nodal point of the unified or cyclopean eye. It is evident, therefore, that theoretically the only position where a single object could be seen singly would have to be this anterior nodal point. It has therefore been my contention that anomalous projection has, temporarily at least, ceased to exist when such a patient can be made to binocularly distinguish a single object as a single unit, when this object is located at the exact crossing point of the primary visual axes. It has long been known that many anomalous projectors, both of the divergent and convergent types, can under favorable conditions experience normal binocular vision and Verhoeff, Bielschowsky, myself, and others have demonstrated stereopsis, lustre and the existence of a fairly normal horopter when these conditions are fulfilled. Dr. Verhoeff, however, did not believe that in these cases there existed "normal correspondence," and certain tests forced him to the conclusion that in these cases anomalous projection continues to exist in spite of the fact that retinal images projected to the fixation point underwent normal replacement. He assumed therefore that "in such cases there probably exists a surface which may be termed replacement surface, similar to the horopter. If two retinal images are projected to the same place in this surface, they may undergo normal replacement. If the same two objects are projected beyond this surface, they are seen separated laterally in space, and each is seen without obscuration by the other."

My further experimentations have proven Dr. Verhoeff's contentions to be erroneous in that they have conclusively established the fact that this "replacement surface" is nothing more nor less than the normal horopter and that, once unified bi-macular perception has been established, the patient cannot under any condition project these visual sensa-

3. Brock, F. W., Anomalous Projection in Squint. Am. J. Optometry Vol. 16-6, Page 203.

tions to any surface beyond the crossing point. It is, then, only necessary to (1) establish this normal horopter, (2) to extend this horopter plane to further and further distances from the patient's eyes and (3) to coordinate the extrinsic ocular muscles so that the eyes may converge at the point of fixation and (4) to establish conscious perception in the suppression areas, in order that normal binocular vision may supersede anomalous projection at all distances and at all times. This has been accomplished in several of my patients and in all these cases anomalous projection has entirely ceased to exist. The fact that such cures can be permanently accomplished necessitates a decided change in our conception of the cerebral mechanism responsible for binocular vision and it is a strong argument in favor of the existence, somewhere in the visual cortex, of independent monocular centres for the subconscious or conscious perception of retinal stimuli reaching the cortex from both eyes, and for the presence of a "unification centre" responsible for most conscious visual perceptions in normal binocular vision, a centre which might be considered entirely defunct in anomalous projection but which, in the greatest number of these cases may be stimulated and trained to take over its long forgotten or never existent normal functions. How this centre is thought to be responsible for fusion and stereopsis and how it is thought to be correlated with the rest of the cortical visual centres will be discussed in a subsequent paper dealing with a modified theory of binocular vision.

DR. FREDERICK W. BROCK,
39 VICTORY BLVD.,
STATEN ISLAND, NEW YORK CITY.

FURTHER EXPERIMENTS ON THE ACCOMMODATION-CONVERGENCE RELATIONSHIP*

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Columbus, Ohio

In a paper presented to the American Academy of Optometry in 1937,[1] special apparatus and methods were described for measuring relative accommodation and relative convergence. The present paper is concerned wtih an analysis of the experimental results obtained with the type of apparatus and procedure described in the last paper.

Inasmuch as both the apparatus and the procedure have been modified, it will be worthwhile to present a detailed description of them in this paper. The apparatus, which is illustrated in Fig. 1, consists of two parts (a) a reflecting phorometer for controlling and measuring convergence, and (b) a device which utilizes Scheiner's principle for measuring accommodation. By means of an adjustable biting board the head is held fixed so that the centers of rotation of the two eyes are located above the points R and P. The mirror (G) and lens (M) before the left eye are mounted on a swinging arm (RG) which pivots around R. The left hand target at A is mounted on a swinging arm (KA) which pivots around K. A rod (AG) connects the two swinging arms so that they are always parallel to each other. The target remains perpendicular to AG. The left mirror is automatically rotated around the vertical axis G so that the image of A is always seen in the direction RG, and hence the left eye in fixating A always looks directly through the optical center of the lens (M). This arrangement makes it possible to measure the deviation of the left eye from its straight forward position by the angular swing of the arm carrying the mirror.

The mirror at H is mounted so that the image of B is located at T which lies 40 cm. from the spectacle plane (CC'). The lens (N) placed before the right eye is centered on the line of sight (PT).

*An abridgment of the material presented before the American Academy of Optometry at Richmond, Va., June 23, 1938.

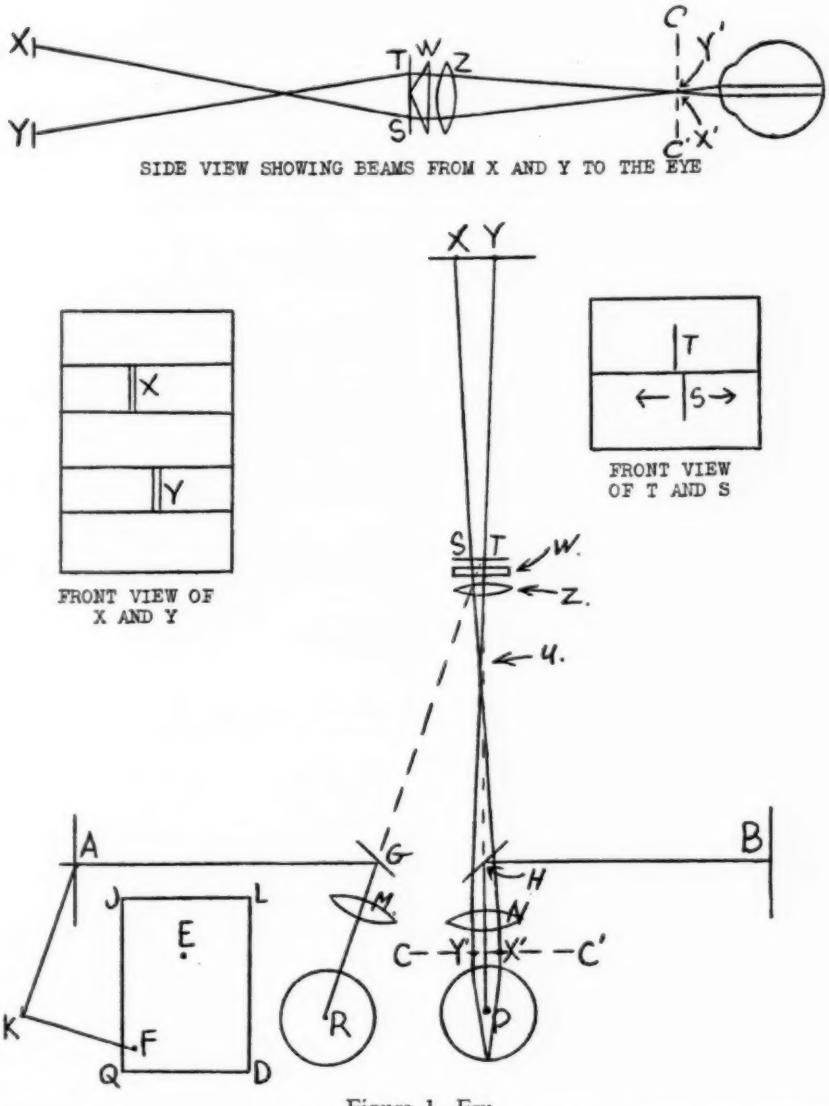

Figure 1. Fry
Apparatus for measuring the zone of play between accommodation and convergence.

The arms KA and RG are swung around their pivot points K and R by an electric motor whose direction can be reversed so that the amount of convergence required for single vision of A and B can be either increased or decreased at a constant rate, the speed actually being .25° per sec. in the experiment described below. The lines M and N on the targets (see Fig. 2) serve as checks as to simultaneous fixation of A and

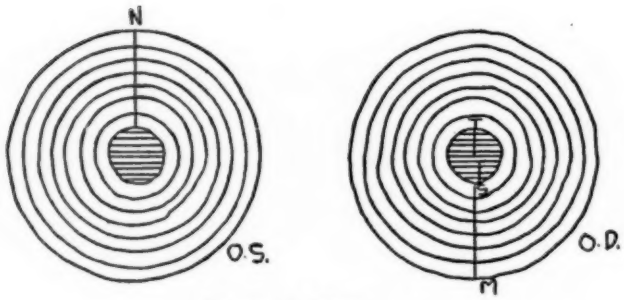

Figure 2. Fry.
Targets presented to the two eyes. The lines T and S are not part of the target for the right eye but represent the slits seen through the mirror.

B for when M and N fail to appear in vertical alignment the eyes have become dissociated.

The targets at A and B serve as stimuli to accommodation as well as stimuli to convergence inasmuch as the subjects are requested to maintain as clear vision as possible of the horizontal lines in the central circle. The amount of accommodation required for clear vision is determined by the distance of the target from the eyes and the power and position of the lenses (M and N). The procedure in these experiments has been to let the subject wear his own spectacles, if any, and to assume that this corrects the astigmatism and reduces the accommodation to zero for distant objects. In order to stimulate or inhibit accommodation, plus and minus test lenses (M and N) were located 18 mm. in front of the spectacle plane which makes a total distance of 32 mm. from the cornea. The distance of these lenses in front of the spectacle plane was considered in computing their effect upon accommodation. Changes in accommodation were reckoned in terms of the reciprocal of the distance from the point for which the eye is accommodated (U) to the spectacle plane (CC′).

The point for which the right eye was accommodated was measured by means of the two sets of slits X-Y and S-T. X and Y are placed one above the other as shown in Fig. 1. The image (X′) of X is formed by the lower part of the double prism (W) and the lens (Z) in the spectacle plane (CC′). The image of (Y′) of Y is formed by the upper part of the double prism and the lens falls also in the plane CC′ 2 mm. to the subject's left of X′.

A screen with the vertical slit (T) covers the upper half of the double prism. A second screen with a vertical slit (S) covers the lower

half of the double prism and can be displaced horizontally with respect to T. We have, therefore, two beams of light to be used in the experiment, one beam from X which passes through slit S to the point X′; and the other from Y through slit T to the point Y′. The two beams TY′ and SX′ pass through the two edges of the pupil. These beams have to pass through the mirror at H, and for this reason this mirror has to be semi-transparent. The two luminous slits (T and S) as seen by the subject appear as part of the mirror image of the target at B as shown in Fig. 2.

In order to determine the point for which the eye is accommodated, the subject turns a wheel which regulates the position of S until it appears vertically aligned with T. The rays from S and T cross at the point U which represents the conjugate focus of the retina. This point (U) may lie in front of or behind T depending upon whether S is displaced to the left or right of T.

The changes in position of the arm AK carrying the target and the changes in the position of the slit S are automatically recorded on a piece of paper mounted to the board JQDL. This board is moved by a motor in a direction parallel to JQ. A cam on this board engages a lug (F) on the arm (KF) and hence as the board moves parallel to JQ the arm KF rotates around K. AK also moves around K since it is rigidly attached to KF. In adjusting the position of slit S, the subject moves the pencil E perpendicular to the direction JQ.

The data obtained in this way can be quickly translated into terms of convergence and accommodation by means of a celluloid graph which is placed directly over the record. A separate celluloid graph is used for each auxiliary lens power and is calibrated to indicate the exact amount of accommodation and convergence in play.

The experimental data presented in Fig. 3 make it possible to analyze to a certain extent the neurological motor mechanisms subserving accommodation and convergence.

The space between the two lines EF and CD represents the zone of play between accommodation and convergence. The horizontal distance across this zone in terms of degrees gives a measure of the amplitude of change in convergence independent of any change in accommodation. This is known as relative convergence because it represents the amount of convergence relative to a fixed amount of accommodation. The vertical distance across the zone gives a measure of the amplitude

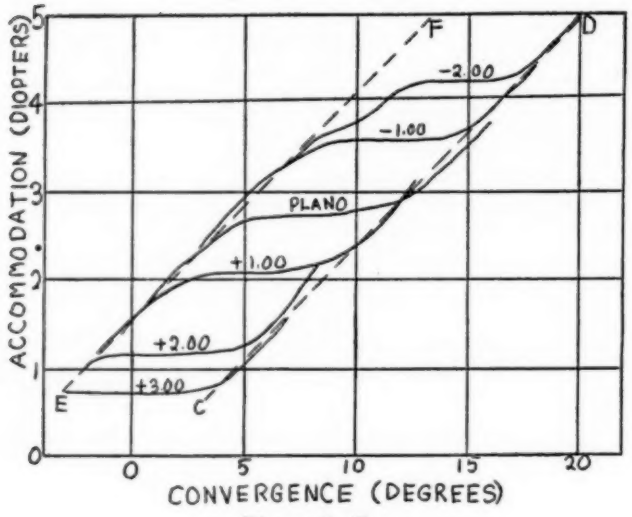

Figure 3. Fry

Graph showing the zone of play between accommodation and convergence in the case of G. A. Fry. No distance correction was used.

of change in accommodation independent of any change in convergence. This is known as relative accommodation because it represents the change in accommodation relative to a fixed amount of convergence.

Donders,[2] the original investigator of the zone of play, and many others who followed him, made no further analysis of the problem than that of formulating the concepts of relative accommodation and relative convergence. These concepts were not intended to have any analytical significance with respect to the underlying neurological mechanism.

Since the time of Donders, definite attempts have been made to formulate a conception of the neurological basis for the zone of play. It will be worthwhile to consider for a moment that particular analysis presented by Sheard in his book, "Dynamic Ocular Tests."[3] This analysis is not original with Sheard because he attempts to trace it back to such men as Maddox and Von Graefe.

Sheard postulates first of all a source of innervation which he calls tonic. This is the innervation which controls the position of the eyes when accommodation is relaxed and the eyes are dissociated. It is the position which the eyes assume during the taking of the distance phoria. This position is indicated on the graph in Fig. 4 by the point A. Now if the eyes are continued to be dissociated and accommodation is brought into play either by minus lenses or by moving the target nearer to the

subject, the eyes if normal will turn inward. This increase in convergence is known as accommodative convergence and can be represented on the graph in Fig. 4 by the line AB.

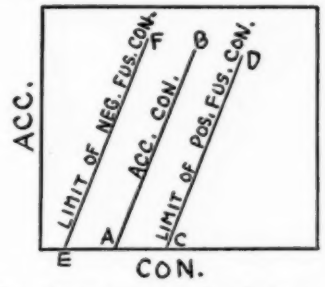

Figure 4. Fry. Sheard's analysis of the zone of play.

Sheard also postulates what is known as positive and negative fusional convergence. The positive fusional convergence represents the extent to which convergence can be increased over and above the accommodative convergence associated with a given quantity of accommodation. The limit of positive fusional convergence for the various quantities of accommodation is represented by the line CD and inasmuch as the positive fusional convergence is a physiological entity it must be considered constant and hence the line CD must be parallel to AB. In a similar way the negative fusional convergence represents the extent to which the convergence can be decreased below the amount associated with the accommodation in play. Its limit can be represented in Fig. 4 by the line EF which is parallel to AB. The horizontal distance between EF and CD represents the total amplitude of positive and negative fusional convergence and inasmuch as the sum of the two must be constant regardless of the amount of accommodation in play, the lines EF and CD must be parallel.

Sheard has not given an explicit explanation of the physiological basis for relative accommodation at any point in his writings. The explanation, however, which is implied may be formulated as follows: As accommodation increases, this brings into play accommodative convergence and since convergence has to remain fixed, negative fusional convergence must be exerted to compensate the increase in accommodative convergence. When the limit of negative fusional convergence is reached, accommodation and accommodative convergence cannot be further increased without producing diplopia and inasmuch as blurred vision is more tolerable to the subject than double vision, the accommodation and its associated convergence are brought to a halt and further increase in the

stimulus to accommodation merely results in blurred vision. The extent to which accommodation can be increased without producing more accommodative convergence than can be compensated by negative fusional convergence represents the positive part of the range of relative accommodation. In a similar manner, the negative portion of the relative range of accommodation represents the extent to which accommodation can be relaxed without producing a decrease in accommodative convergence greater than can be compensated by positive fusional convergence. According to this analysis of the problem, there is no necessity for postulating any innervation to accommodation except that which has associated with it the accommodative convergence.

In order to obtain a measure of relative convergence for different amounts of accommodation, auxiliary lenses (M and N) of the following powers were placed before each eye: +3.00, +2.00, +1.00, plano, —1.00 and —2.00 D. For each pair of lenses the first step was to adjust the arm RG to correspond to an amount of convergence equivalent to the stimulus to accommodation. This of course depends upon the P.D. and was determined in each case from a graph which was applicable to all P.D. values. The next step was to have the subject adjust the position of S to make it appear vertically aligned with T. Then the arm RG was gradually rotated counter clockwise giving the effect of an increase of base in prism at the rate of .25° per sec. and the subject was requested to keep the slit S vertically aligned with T and to report when diplopia was experienced. The subject was then permitted to close his eyes till the arm RG was set in its initial position and the procedure was repeated with RG rotated clockwise. This whole procedure was repeated at least once and more often when the results were uncertain. A single curve was drawn on the record indicating the average for all the curves and this was later transcribed to a graph like that in Fig. 3 showing the average curves for all lens powers. This whole procedure was repeated for the various lens powers.

Except those corresponding to the lower end of the range of accommodation, the curves are ogive in form. The lines tangent to the extremities of the curves represent the limits of relative convergence.

It is needless to say that other analyses have been made of the neurological basis for the relationships existing between accommodation and convergence. One particular theory which is of historical importance to Optometry is that of Cross.[4] His analysis of the relationship between

accommodation and convergence is represented by the diagram in Fig. 5. The line EF represents the so-called convergent-accommodation which

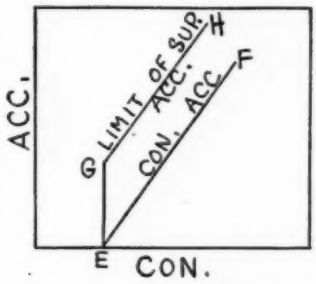

Figure 5. Fry. Cross' analysis of the zone of play.

may be conceived to be the accommodation associated with the various amounts of convergence. Cross believed this to be a fixed relationship for all individuals, one diopter of accommodation being associated with each meter angle of convergence. He accounted for the play between accommodation and convergence by postulating a supplementary innervation to accommodation which is independent of the innervation to accommodation associated with convergence. This made it possible to increase the accommodation over and above that amount associated with convergence. The limit of the supplementary accommodation for various amounts of convergence is represented in Fig. 5 by the line GH.

The analyses of both Cross and Sheard are adequate to account for the zone of play between accommodation and convergence, and hence it is necessary to consider some other phase of the problem before one can decide which theory is correct. One criterion which can be used for this purpose is the amplitude of relative convergence at the point of maximum divergence. The point of maximum divergence is obtained when accommodation is reduced to zero and is represented by the point E in Figs. 4 and 5. According to Sheard's theory, there can be no negative relative accommodation at this point because the accommodation is at its zero level. Furthermore, there can be no positive relative accommodation because there is no negative fusional convergence available to compensate an increase in accommodative convergence. In other words, the vertical distance across the zone of play at this point must be zero. According to Cross' theory there is nothing to prevent the use of supplementary accommodation at the point of maximum divergence and the vertical distance across the zone of play should be just as wide at this point as at any other.

Sheard's analysis rather than that of Cross is supported by the experimental data presented in Fig. 3 inasmuch as the relative accommodation becomes zero at the point of maximum divergence.

The line EF is supposed to be parallel to the line AB which represents the accommodative convergence and the slope of line EF can be taken as a measure of the ratio of accommodation to accommodative convergence. The fact that EF in Fig. 3 is a relatively straight line with no sharp inflections, indicates that it represents a simple relationship between two variables.

According to Dr. Sheard's analysis of the problem, the lines CD and EF must be parallel if the sum of the positive and negative fusional convergence is to be regarded as a constant quantity and this is actually the case in Fig. 3.

Summary

A reflecting phorometer and a special application of Scheiner's principle have been used for mapping out the zone of play between accommodation and convergence. An analysis of the data has led to the following conclusions:

(1) The slope of the boundaries of the zone of play can be taken as a measure of the ratio of accommodation to accommodative convergence.

(2) The width of the zone of play is determined solely by positive and negative fusional convergence which are independent of changes in accommodation. The sum of the two functions represents the horizontal distance across the zone of play.

(3) No special physiological significance can be attached to the vertical distance across the zone of play.

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DISCUSSION

DR. BEITEL: Dr. Fry, did I understand you to say there is no accommodation that is not associated with accommodative-convergence reflex?

DR. FRY: I put it the other way around—that there was no accommodation beyond the limit of positive fusional convergence.

DR. NEUMUELLER: Within what limits of accommodation, or convergence for that matter, does your data show that these two lines are parallel?

DR. FRY: The experiment was only carried up to five diopters.

DR. NEUMUELLER: But would you not say that they go on?

DR. FRY: I would have no proof of that, as far as this particular procedure is concerned, but if you will go back to the data of Landholt and Donders, you will find that they do continue parallel to the maximum point of convergence, and there are a few experimental variations there which I do not know how to explain.

DR. NEUMUELLER: Were ametropic subjects used in this experiment?

DR. FRY: Yes. The only case, or rather the only indication of a lack of parallelism, that I have found so far is a tendency for the limit of positive fusional convergence to slope down and become asymtotic to the zero level of accommodation. That was illustrated in Fig. 3.

This is particularly significant from a clinical point of view because so much emphasis has been placed on the base-out to blur at distance. Some writers have interpreted that as a measure of the width of the zone. However, that is not true because your width would have to be measured at the point where the two lines do become parallel. The failure to get a high base-out blur point at distance is related to the tendency of this line to curve down at the bottom. Some writers have attempted to associate that with a hypertonicity of accommodation and that seems to provide a fairly satisfactory explanation for it.

DR. HUTCHINSON: Have you considered the question of age in

your problem? Of what ages were the subjects or did you find the results reasonably comparable in persons of different age groups?

DR. FRY: This particular technique has been applied to individuals of various ages. There is a significant type of picture which is obtained in those individuals manifesting a low accommodative amplitude. The same type of picture is obtained in those individuals manifesting no blur point. However, we must regard these as atypical.

DR. HUTCHINSON: What relationship, if any, is there between this particular procedure and the results of Ferree and Rand? It seems to me that part of this function we call accommodation may be closely connected with that accommodative activity accompanying pupillary contraction. They at least called it apparent amplitude and not actual.

DR. FRY: These apparent variations in amplitude are probably associated with the problem of the depth of focus, which does depend upon pupillary size, however, they do not enter into this particular procedure. You may determine this by noting that these measurements are accurate down to a twentieth of a diopter.

DR. BEITEL: Dr. Fry, do you think that a consideration here would support the idea that there is such a thing as positive distance accommodation? Or that there may be a relationship between distant accommodation and negative fusional reserve. Or that in obtaining the absence of a blur would indicate an antagonism to divergence in the form of an accommodative convergence that maintained clear vision. There is recent evidence founded upon investigations by psychological means that indicates a relationship between the divergence and the positive accommodation for distance.

DR. FRY: In other words, should we analyze the problem of accommodation in terms of both a forced relaxation and a forced exertion of accommodation? That, of course, is a question which has not been solved. As far as this particular experiment is concerned, it wouldn't make any difference whether you had a forced relaxation or just a relaxation of one particular function. In both cases you would have your convergent accommodation associated with them. That is, it would work both ways inasmuch as you have a zero range in accommodation at the point of maximum divergence which would eliminate any accommodation independent of convergence. Whether you have two factors is a problem which is entirely separate. The thing which has been determined with an experiment of this type is that the zone between accom-

modation and convergence is a freedom in the convergence aspect of the problem and not a freedom in the accommodative aspect. That is indicated both at the point of maximum divergence and at the point of maximum convergence but that could not be carried out with this type of equipment. The curves which have been plotted by Donders and Sheard and others indicate that the accommodation increases and you do reach a point of maximum accommodation. The curve levels off at that point and you have exactly the same proposition of a zero range of relative accommodation at this point as you do at a point of maximum divergence.

Current Comments by Carel C. Koch

Editor, American Journal of Optometry

Optometrists will confer a favor by sending for this department items of news of general interest: such as relate to new instruments, clinical techniques, education, public health and optometric legislation.

EDUCATIONAL COUNCIL ASKS FOR GREATER POWERS

The educational council has requested greater powers. This request was made at the recent congress of the American Optometric Association at Los Angeles, and after some discussion the delegates passed a resolution granting the request insofar as this was possible on their part.

Whether this decision was a wise one or not, only time will tell. The resolution which was passed now permits the educational council to invade the field heretofore supervised by the International Association of Boards of Examiners in Optometry, an independent organization generally known as the International Board of Boards or the I.B.B.

In some quarters this action on the part of the delegates to the A.O.A. congress might be interpreted as a criticism of previous conduct on the part of the I.B.B. Perhaps it was. If so, the writer feels this criticism to be very unjust, as the I.B.B. has for many years served our profession in the important work of supervising the educational centers which train optometrists. In this the I.B.B. has done an outstanding job.

The educational council, which is a section of the A.O.A., has now demanded and received a form of jurisdiction in (1) the matter of certification of optometry schools, and (2) the right to change the type and amount of educational training received by undergraduate optometrists at their schools. These are important demands which cover in part some of the work previously so well done by the I.B.B.

The writer is unfamiliar with all of the reasons which prompted the educational council to make these demands, but in considering the action of the delegates at the recent congress of the A.O.A. in acceding to them, two facts are evident which deserve consideration.

These facts are as follows:—First; neither the A.O.A. nor any department of the A.O.A. has now, or will have in the future, any real jurisdiction in this field. The reason for this is, that these voluntary

bodies have no standing at law in relation to the various optometrical acts. The A.O.A. is a corporation which has only the power to suggest and recommend actions to optometry boards or schools. It has no power to enforce its suggestions. The I.B.B., on the other hand, is in a different position. It officially represents the State Boards of Optometry themselves. These state boards are creatures of law and are charged by law to admit to examination only qualified graduate optometrists, it being the duty of each board to supervise the colleges and university schools which teach optometry, to assure themselves in behalf of public welfare that the educational background of each future optometrist is up to certain rather high standards.

This is an obligation at law and one which no board can delegate to any unofficial body which it does not control in full. Therefore the state boards of examiners in optometry cannot delegate these responsibilities and duties to the educational council or any other unofficial body. Should the boards desire, they can naturally work in close harmony with the educational council but the real responsibility for this educational supervisory action must stay with the state boards themselves and can only be successfully carried out by the joint action of all boards working through the I.B.B. The I.B.B. speaks officially for all boards on matters dealing with optometric education and when rulings in this field are to be made and enforced the I.B.B. has the full power of the law behind it and is the natural and logical organization to carry out this work.

The second fact which deserves consideration when reviewing the action of the delegates in acceding to the demands of the educational council is this: In optometry as in all other professions there exists sincere differences of opinion as to the value of certain examination procedures and diagnostic techniques. Some specific techniques have large groups of enthusiastic proponents and from time to time, these band together to force their views upon the profession at large. This is not done in the dictatorial spirit, but rather because of their fanatical desire to promote what they honestly believe to be the best interests of the profession. However, this type of enthusiastic mass action has little place in the rational development of a technical calling. If the proposed procedures are sound and based upon real scientific facts, they will in time become adopted by all without high-pressure sales arguments or without official action by organized societies. Evangelistic faith will not, however, take the place of scientific shortcomings.

But this type of enthusiastic mass action, may at times unduly sway the thinking of professional people, who as delegates are attending a meeting of a professional society. For instance, a professional society organized and convened as is the A.O.A. at its annual meetings. The effect of such action, would to be sure, be but temporary, if the proposal were not sound from a technical standpoint, but action of this sort could seriously upset basically sound educational programs which had been running smoothly for years. This is particularly true if such actions are entered into hastily and without the most careful consideration.

The establishment of an educational council serving the profession under the domination of the delegates to the A.O.A. leaves this council open to every impulsive injunction which may be passed by enthusiastically controlled mass action by delegates who have been temporarily swept off their feet by zealous workers for any particular cause. An enthusiastic band of practitioners working at a convention, because of their intensive belief in what seems at the moment to be an ideal, could cause, for the time being, the delegates to loose their sense of values, and vote instructions to the educational council which were unsound.

This type of thing is much less apt to happen when the I.B.B. convenes. In the first place its meetings are closed meetings and are much smaller gatherings, and are therefore productive of better thinking and cooler reasoning. Then, too, all important actions taken by the I.B.B. must be approved by the individual boards themselves, each meeting in its own State at some later period when the more or less stimulated efforts of the convention have been left far behind. And, last, members of the I.B.B. are all members of state boards of examiners in optometry, who are appointed for periods of years by the Governors of the various States, and are thus more free from local optometric pressure.

The delegates at the A.O.A. congress have spoken. The educational council is now charged, on behalf of the A.O.A. to interest itself in the curriculum of our various individual educational centers. This may be a good move and a step in the right direction but it is obvious that these new duties just granted the educational council must be handled with care and it is hoped that this committee will work in harmony with the I.B.B. for the good of all concerned.

A PROPOSED NEW BI-MONTHLY JOURNAL

A movement is now under way, in the American Academy of Optometry, to establish, with the assistance of the Williams & Wilkins Company of Baltimore, a bi-monthly magazine to function in the fields of ocular work, physics, psychology and physiological optics. We presume this new journal will be somewhat similar to the former AMERICAN JOURNAL OF PHYSIOLOGICAL OPTICS, which was edited by Dr. Charles Sheard of the Mayo Clinic. A journal which suspended publication about 12 years ago. In fact, according to a bulletin received from the secretary of the Academy, Dr. Charles Sheard has already agreed to assume the duties of Editor-in-Chief of the proposed new journal, if the present plans materialize.

There is some difference of opinion, however, as to the advisability of this new venture. The proponents of the plan argue that many worthwhile research papers dealing with more or less obscure phases of vision now fail to be published because the technical journals in both optometry and ophthalmology refuse to print them, on the grounds that these papers contain little of immediate or practical value to their readers. These journals, claim the proponents of this plan, prefer to publish material of a more practical nature and thus these research papers seldom see the light of day. While there may be something to this argument, it is not entirely well founded inasmuch as the AMERICAN JOURNAL OF OPTOMETRY and other similar journals in the ocular field, do print, from time to time, papers dealing with abstract research problems.

On the other hand there seems to be a serious defect in this scheme as now set-up. The American Academy of Optometry is an optometric organization. It was so founded in 1922 and it should carry-on as such. At the last annual meeting of the Academy when this proposal was first made, it was suggested that this new proposed journal should function as a medium through which the officers of the Academy could promote the interests of that organization. This is all very well, but how can this be done, with a purely scientific journal edited by a man whose very position is such that it would preclude him from taking a vigorous position in favor of optometry should the need arise.

One can only judge the future by the experiences one has had in the past. For several years Dr. Charles Sheard served as editor of the AMERICAN JOURNAL OF PHYSIOLOGICAL OPTICS. It was a fine technical journal. It carried many valuable papers. Many optometrists, oculists and

educators liked its make-up and its contents, yet it never enjoyed a large circulation because of one inherent defect. It was neither an optometric publication nor an ophthalmological one. The AMERICAN JOURNAL OF PHYSIOLOGICAL OPTICS failed, in the judgment of the writer, because neither optometry nor ophthalmology could claim it as their own.

It is idle to contemplate the advantages of having a medium that will appeal to both optometrists and oculists. The two groups are competitive, and there is little likelihood that much can be done in the near future to bring them together. Leaders in medicine insist that every eye examiner have a full medical education even though they admit that this is but little used by the oculist. They have repeatedly taken this stand and seem little likely to recede from it. Optometrists on the other hand, feel that their present four year college courses in ocular and refractive techniques, better equips them for the detailed work of refraction than do the short courses of eye, ear, nose and throat work given to the medical graduate to make him the specialist he claims to be. There is little or no common ground here, and any journal which attempts to cover both fields by ignoring these fundamental differences in thinking, on the part of the two schools of eye specialists is bound to be rather displeasing to both groups.

This being true, the writer feels that it is a mistake for the American Academy of Optometry to publish a journal of this sort. Why should a fine and vigorous optometric group do this? Have we seen any indication of an organized effort on the part of any group of oculists to get out a publication which would fairly bridge this gap? Or have we seen on their part any effort made to fairly present both views as they exist today on the differences of opinion in refractive practice? Not in the least! The most recent publication gotten out by oculists, or at least with the aid of oculists is the SIGHT SAVING REVIEW, a publication for lay persons which entirely ignores the optometrist and contains many references in its published contents, of the great advantage to the patient in having all eyes examined by oculists.

If optometry needs more publications, it needs them as optometric magazines. Not journals in which the word "optometrist" must not appear. In the old AMERICAN JOURNAL OF PHYSIOLOGICAL OPTICS the editorial policy carried out by Dr. Charles Sheard was to call both groups of eye specialists by the general term of "refractionists," thus ignoring the major problem and pleasing no one. If he assumes the editorship of this

new proposed journal, he will no doubt adopt the same policy towards both professions, and optometry is then left with the cost and the trouble of developing a journal which will never really be hers. In his present position as a professor in the Graduate School of Medicine of the University of Minnesota, it is reasonable to assume that irrespective of his personal desires, Dr. Charles Sheard would and will be forced by his associates at the clinic to hold to this middle of the road position.

In this event, to be sure, he could edit a journal that would never offend anyone, but what good would such a journal be to optometry at this time, facing as it does the many critical issues of the day. This new proposed journal is to be the organ of an optometric society. As such it cannot ride both horses at the same time and do justice to the Academy or the profession the Academy is here to serve. In the effort to straddle the fence and keep both ears to the ground at the same time, the Editor-in-Chief would have, in all probability, his second sad experience in the publishing field. Perhaps in the years to come, a compromise journal of this character will have a place in the scheme of refractive things. This time, however, has not as yet arrived.

NEW ZEALAND CENTENNIAL EXHIBITION

Mr. R. Brooke-Taylor, President of the Institute of Opticians of New Zealand, has extended a gracious invitation to the optometrists of America to attend the New Zealand Centennial Exhibition which will be held in Wellington from November, 1939, until May, 1940.

This exhibition, which marks one hundred years of development of this country, is being organized on a very extensive scale, depicting world trade and industry as well as the scenic beauties of New Zealand. Due to extensive publicity, thousands of overseas tourists will be visiting New Zealand during that period, and it is hoped that among their numbers will be many optometrists. To these visitors the Institute of New Zealand desires to extend a hearty welcome with the assurance of a happy time amongst the optometrical fraternity of that country.

The annual conference of the Institute has been arranged to take place in Wellington during the Exhibition period, commencing on the 19th of February, 1940, with a duration of one week devoted to optometric technical and social activities. The institute is looking forward to having overseas optometrists attend this conference. Optometrists intend-

ing to make this journey should communicate with Mr. R. Brooke-Taylor, 41 Willis Street, Wellington, New Zealand, who on behalf of the Institute will be glad to render every assistance possible.

AN OBSERVATION ON THE UNMET VISUAL NEEDS OF THE AMERICAN PUBLIC

One reads with some interest Resolution No. 1, adopted by the delegates at the annual congress of the American Optometric Association, at Los Angeles. This resolution offers the refractive services of the optometrical profession to duly delegated authorities. The suggestion being that the optometrist participates in any program of visual care which may in the future be set up either by the federal government or by individual state governmental units.

This resolution was a meritorious one and deserved the approval it received but the chief point of interest to all optometrists and many others was that portion of the resolution which referred to the unmet needs of the American people with respect to eye care.

Just what are these unmet needs? What portion of the American public is suffering from uncorrected or improperly corrected refractive errors? Of this total what portion are suffering as the result of inadequate ocular care due to their inability to pay for such service? And last, in what portions of these United States are the numbers of optometrists inadequate to properly care for the visual requirements of the public? Until these questions can be answered with a reasonable degree of accuracy it would perhaps be well for those in charge of the policy making phases of our national association to be more careful in their choice of phraseology to be used in reference to this important subject.

The actual sentence reads, " . . . that the needs of the American people with respect to eye care are unmet." This statement is certainly open to some question. In the first place it is an indictment of all those doing eye work at the present time, and if left to stand as it is would warrant any official body in taking the stand that if the eye specialists of the country who are here and have been practicing for years, have by their own admission, been unable to meet the visual requirements of the people, that perhaps steps should be taken to find some new group that could meet these needs. Of course the resolution does not really mean

what it says but is merely an example of a carelessly and loosely drawn document.

It is fairly safe to presume that what the resolution is attempting to say is that among a certain small segment of the people, visual needs are unmet because these people are unable to pay for the required services, and the resolution goes on to add the offer of the services of optometrists to fill these needs under certain social welfare programs as these are organized.

What is really needed, however, to supplement this resolution and to materially strengthen the position of optometry in the welfare field is factual information which will show by county units, (1) The population of the county. (2) The number of optometrists in practice in the county. (3) The number of families now receiving either entire or partial assistance from welfare boards. (4) Data showing the prevalence of refractive problems among various age groups for each locality. (5) Data relative to refractive services now being offered to indigent persons by tax supported agencies, and (6) data relative to refractive services now being offered to persons in the low income levels by private agencies such as free optometric clinics, school eye clinics, out-patient departments of hospitals and settlement house clinics.

With these facts assembled by counties, as a background for the entire country, one would then be in a position to make a number of spot surveys, in say 60 or 70 selected counties, to determine the actual present visual status of a large number of persons. A statistical breakdown and study of the latter figures in relation to the original county figures would put the American Optometric Association in position to really discuss this vital problem of visual efficiency and eye care with some degree of authority.

NOTES ON THE CAUSATION OF ORGANIC MYOPIA

In a recent issue of the OPTICAL JOURNAL AND REVIEW, Vol. LXXVI, No. 15, pp. 16-17, 1939, the oculist Josephson presents an interesting hypothesis as to the causation of myopia and a suggested treatment for this condition. He believes that organic myopia is caused by an increase of hydrostatic pressure within the eye. This is, in itself no new idea, it having been presented to the optometric profession on several prior occasions by other writers in the AMERICAN JOURNAL OF

OPTOMETRY. Josephson's technique in treating these myopic cases is unique, however, and merits further study.

He believes that the control of organic myopia depends upon the control of the water exchange of the body. He further feels that both diet and certain internal secretory glands serve to influence the water exchange of the body and therefore attempts to effect changes in these functions by changes in diet.

Josephson feels that the elements in diet and body chemistry which most largely influence the exchange of water between the blood and the tissues are sodium chloride, certain minerals, proteins and Vitamin A. Diets low in any of these factors, may, he believes, precipitate the development of organic myopia. It does not necessarily follow, however, that in all cases in which diet is rich in these food values that myopia will not appear inasmuch as the system may be in such condition as to fail to assimilate them properly. To overcome this, Josephson suggests the intra-muscular injection of carotene. In cases in which this technique has been attempted he reports prompt improvement. His report indicates that proper diet may have an important bearing on the development of myopia, a fact of interest to all optometrists.

CONTACT LENSES USED TO TEMPORARILY CHANGE THE APPEARANCE OF THE EYE

Several months ago the optometrist R. Greenspoon of Beverly Hills, California, received an unusual request from the Metro-Goldwyn-Mayer Studios. This request was that he temporarily change the color of the eyes of one of their actors, from his permanent dark brown hue to light blue in color. A change which seemed apparently necessary to enable him to carry a new part which had been assigned to him. Greenspoon suggested that if given sufficient time, a method might be devised, to accomplish this desired result. The studio replied that they would give him just one week in which to accomplish this.

On that same afternoon, the actor, Mr. Henry Hull of *Tobacco Road* fame, was examined by Greenspoon and contact lenses were fitted to his eyes for the first time. Fortunately, plano trial-case contact lenses were sufficiently satisfactory to enable him to wear these with no particular distress, and their use also permitted him sufficient visual acuity to enable him to read his manuscripts and do his lines in the play.

The problem then confronting Greenspoon was that of fusing

opaque light blue colored glass to the corneal portion of the contact lens, at the same time leaving a clear round pupillary aperature of four millimeters in diameter through which Hull could see. After several attempts, Greenspoon succeeded in accomplishing this.

Exactly one week from the time of the first request, Greenspoon inserted these new colored contact lenses on to the eyes of Mr. Hull; much as he says [1], to the amazement of motion picture directors, writers and make-up men, who were present, at this initial trial of this new device. Cinema tests of various kinds were then made upon the subject Hull and the results were pleasing to all concerned. Greenspoon then removed the colored contact lenses, the actor reporting that his eyes felt fine, and that the bright lights used on the set did not affect him while the contact lenses were in place.

Greenspoon reports that the picture in which the actor Hull appears, wearing these colored contact lenses, has just been released. The title of this production is *Miracles for Sale* featuring Robert Young. He adds that during the continuity of the play one contact lens is removed and a remark is made with reference to invisible eyeglasses.

This is the first time within the scope of the writer's knowledge, that a successful attempt has been made to temporarily change the color of the eyes of professional stage people, and while it was natural for them to do this, it is nevertheless gratifying to the writer that the large motion picture studios turn to an optometrist for the execution of such an exacting task. It will be of interest also to optometrists to know that in the recent *Popular Science* film released by Paramount, that the sequence showing pictures of patients inserting and wearing regular contact lenses was taken in the office of the optometrist Greenspoon and that he played the principal role in this portion of the film, as well as supplying the technical data used in the narration which accompanied this picture.

WAR AND ITS EFFECT UPON OPTOMETRY

Fundamental changes have occurred in optometric practice in the last decade, and during this same period, even more basic changes have occurred and are continuing to occur in the world in which we live. Changes which will affect the lives of all optometrists as well as the

1 Letter to Editor, August 22, 1939.

very conduct of their practices. Many optometrists have realized the need for keeping abreast of these new developments, and have sought to adapt their technical skills and their general practice procedures to meet, as far as possible, these world wide general changes. The war now begun will do much towards forcing all of those optometrists who survive this era, to bring their practices to a still higher level of technical proficiency, and will also force those optometrists who have been practicing in non-professional surroundings to remold their practices and carry these on in a professional manner.

Medicine is rapidly, though in some quarters reluctantly, realizing the effect of these far reaching changes in the attitude of the public towards those doing health work, and to the entire problem of health, and is now seeking ways to adapt herself to these changes. Optometry must also face the fact that it, too, must make certain necessary readjustments to qualify for the important work of the future. Hampered as this profession has been in the past, because of the confusion in the public mind, caused by the very presence of several types of eye specialists; and hampered by the inconsistency of those optometrists who attempt to practice a portion of the healing arts in commercial surroundings; and hampered by the animus of various itinerant educators towards one another and towards every optometric technique not at the moment recommended by them personally; and hampered by the impetuosity of certain of its political leaders; and hampered by the ineffective economic program of its national societies, optometry nevertheless faces the future with confidence. Beset as it is, with the foregoing problems, optometry has, within her very make-up the strength to overcome and surmount in every way these obstacles and to rise from the new trials which are to come, a finer and stronger professional group.

To rid optometry of these economic and professional barnacles, will seem at times a hard thing to do. To be sure, it will take courage, brains and character and also a willingness to make sacrifices all around. It will require a high type of leadership, and a firm resolve to stop at nothing short of the best. The practice of optometry is fortunately built on a firm foundation of scientific facts. Technically it is sound at heart. It is chiefly weakened today by its commercial practitioners, who by their very mode of practice, degrade their calling. The war is bringing these commercial optometrists closer to the end of their road. In the rapid changes which are inevitably brought about during wide spread periods of economic unrest, optometrists who refuse to advance with the times

and practice professionally will find themselves hopelessly outstripped by the new country-wide developments which are to come in the entire health field.

CELLULOSE INSULATION FOR LENSES

In rimless glasses, lens breakage is always somewhat of a problem, therefore the suggestion which appears in the BENCH & COUNTER, Vol. 4, No. 4, pp. 55, as published by the *Shuron Optical Company*, should prove of interest to many optometrists. The suggestion is both simple and unique and is said to do much towards eliminating the breaking of lenses at those points where the lens is mounted to the frame. The suggestion is, that a small strip of scotch cellulose tape be wrapped around the edge and end of the lens at those points on the lens where it will meet the frame. The tape will adhere to the glass and the lens is then mounted in the usual manner. After the lens is mounted, the excess tape is removed from the lens with a sharp pointed needle. The remaining tape forming an insulation between the lens and frame and thus assisting in preventing lens breakage.

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A REVIEW OF CERTAIN OCULAR CASES IN WHICH HYPEROPIA WAS UNDERCORRECTED*

Hypermetropia, or hyperopia as it is more usually referred to, is the refractive condition of an eye in which, when the accommodation is suspended, parallel rays of light would come to a focus behind the retina. It is a condition that almost inevitably calls for correction and may be caused by either one or both of the following ocular conditions: (1) Where the antero-posterior axis of the eye is too short. This is known as axial hyperopia. (2) Where the refractive media of the eye is sub-normal. This is known as refractive hyperopia. The results as far as the patient is concerned are the same in both conditions.

The hyperopic eye, which lacks static refractive power, may replace this deficiency by the use of the accommodation, up to a point limited by the amplitude of accommodation which the patient may possess. In

*The first of a series of nine papers by Carel C. Koch, Opt.D., F.A.A.O., dealing with reported clinical findings. The second of this series will appear in the October issue of the AMERICAN JOURNAL OF OPTOMETRY.

other words, to have normal vision, the hyperopic patient must accommodate every instant that his eyes are open, and this as a rule produces fatigue.

The major symptoms of hyperopia are frontal headaches, a neuralgic pain near the temples, dimness of vision particularly at the near-point, inflamed lids, and a general feeling of ocular weakness. These symptoms of hyperopia disappear when the refractive condition is properly corrected by means of convex or plus (+) lenses.

From the viewpoint of the patient alone, it matters but little whether the hyperopia which is ultimately corrected, is the total hyperopia, the manifest hyperopia, or part of the latent and all of the manifest hyperopia. The patient is looking for a correction which will return the eyes as nearly as possible to his or her normal, and the patient seeks this service from the specialist that can best render such service, *and* the resulting eye comfort which accompanies such service.

For the most part, patients are not interested in the technical problems involved in the prescribing for their individual needs. They are *seeking relief* from certain symptoms. They wish the matter handled in as speedy a manner as is practical, and with the minimum of annoyance to them as possible. They are, in the main, also interested in keeping the cost of the service well within their means.

Optometrists are in an unusually fortunate position in supplying exactly the type of ocular service demanded by the public. Their ocular examinations require, for the most part, but two visits of forty-five minutes each, and thus take but little time from the patient. Their examinations, too, in the great majority of cases require no drugs or treatments and thus leave the patient free to carry on the usual matters which require the attention of the patient on those days in which the examination is in progress.

And because optometrists perform 70 per cent of all the ocular refractive work done in America today, the fee for such service can therefore be kept at a point well within the limits of the patient's ability to meet these costs.

Optometrists, too, are fortunate that their ocular examination techniques are based upon sound scientific principles which in turn are being translated into clinical findings which give the patient the required results. This is not always true, nor does it apply when homatropine, which is

popularly referred to as "drops," is used in making an ocular examination. A practice kept in vogue by certain oculists.

The writer has shown[1] that the use of a homatropine cycloplegic or "drops" in the average eye examination is unscientific and leads to utter confusion in making a determination of the final formula to be prescribed. It is a reprehensible practice and should be abandoned in all general eye practice. That there is a very limited place for drugs in refractive work the writer does not deny, but he does censure the routine use of "drops" or cycloplegics in the average run of refractive cases.

The case reports which follow have been briefly rewritten or abstracted by the writer, but each report contains the salient points of the case under discussion. In every way these case reports substantiate, by means of clinical evidence, the previously offered technical material, which proved without question, the unreliability of ocular refractive findings, taken while the eye was under the effect of drugs.

The reports presented at this time all deal with cases of hyperopia, the most frequently diagnosed refractive disorder. These reported cases of hyperopia were all originally examined by oculists, who, during the course of their examinations, employed cycloplegics or "drops" to assist them in making their examinations. In each of these reported cases, the prescription given the patient by the oculist was inadequate. The amount of hyperopia which was originally corrected was less than it should have been, and the symptoms persisted. These cases were then examined by optometrists, who without the use of drugs were able to prescribe corrections which relieved the symptoms, largely because the optometric examination techniques revealed more hyperopia than did the examinations conducted with the aid of "drops" or cycloplegics.

These brief reviews of previously published cases, are but few, of the many that could have been included in this report. All have been taken from established sources of technical literature, and all were originally written by competent eye specialists. The reports are from comparatively recent periods and assist in fully establishing the fact, that the use of "drops" or cycloplegics in cases of hyperopia fails to help the refractionist in arriving at the one proper formula which will correct the condition.

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1. An investigation as to the need for "drops" or cycloplegics in eye examinations. Carel C. Koch. American Journal of Optometry. Vol. 15, No. 1, pp. 17-38, 1938.

Case Report No. 1

McCulloch reports the following case in the AMERICAN JOURNAL OF OPTOMETRY, Vol. 2, No. 12, page 364. Patient, female, age 24, complains of severe headaches, and an inability to do close work. Patient now using the following correction which had been prescribed by an oculist with the aid of a cycloplegic.

O.D. +1.50 D. Sph. ⌒ +0.25 D. Cyl. axis 180
O.S. +1.50 D. Sph. ⌒ +0.25 D. Cyl. axis 180

McCulloch reports that this same correction had been confirmed by a second oculist who stated that this correction was the full correction under the cycloplegic, and that the headaches and other symptoms proceeded from some other cause than eye-strain. An examination and certain orthoptic techniques were employed by the optometrist, McCulloch, who gave the patient complete relief from all symptoms with the following correction:

O.D. +4.50 D. Sph.
O.S. +4.50 D. Sph.

Case Report No. 2

Block reports the following case in the NORTHWEST JOURNAL OF OPTOMETRY, Vol. 2, No. 1, p. 12. Patient, male, office worker consulted him complaining of an inability to do near work with comfort. He had previously consulted an oculist who had prescribed the following correction which gave no relief whatsoever.

O.D. +0.25 D. Sph. ⌒ +0.75 D. Cyl. axis 10
O.S . +0.25 D. Sph. ⌒ +0.75 D. Cyl. axis 10

After an examination the optometrist Block prescribed the following correction.

O.D. +0.75 D. Sph. ⌒ +0.75 D. Cyl. axis 180
O.S . +0.75 D. Sph. ⌒ +0.75 D. Cyl. axis 15

This correction and some orthoptic treatment work gave complete relief of symptoms and enabled the patient to do all near point work in a satisfactory manner.

Case Report No. 3

Kurtz reports the following case in the AMERICAN JOURNAL OF OPTOMETRY, Vol. 4, No. 1, pp. 17-18. Patient, housewife, age 40, complaining of insomnia, headache and general inability to use the eyes for reading and sewing. An oculist had prescribed the following correction which failed to relieve the symptoms.

O.D. +0.75 D. Sph. ⊃ +1.00 D. Cyl. axis 90
O. S. +0.75 D Sph. ⊃ +0.75 D. Cyl. axis 90
Addition for near-point work in bifocal form, O.U. +1.00 D. Sph.
The following single vision prescription by the optometrist Kurtz gave complete relief from all symptoms including the insomnia.
O.D. +3.75 D. Sph.
O.S . +3.50 D. Sph.

Case Report No. 4

Jackson reports the following case in ARCHIVES OF OPTOMETRY, Vol. 1, No. 2, p. 95. Patient, girl, age 9. A pronounced case of convergent squint that was not improving under the treatment administered by her oculist who had prescribed the following correction for general wear.
O.D. +0.75 D. Cyl. axis 90
O.S . +0.75 D. Cyl. axis 90
The optometrist Jackson prescribed several treatment corrections as well as orthoptics and the squint was entirely corrected. The patient's final correction being
O.D. +3.25 D. Sph.
O.S . +3.25 D. Sph.

Case Report No. 5

McCulloch reports the following case in the AMERICAN JOURNAL OF OPTOMETRY, Vol. 2, No. 12, p. 364. Patient, male, age 35. Occupation, bookkeeper. Patient complained of a constant feeling of itching, smarting and burning and evidenced a pronounced blepharitis. Patient also suffered from headache. For some time had been wearing the following correction which had been prescribed by an oculist under atropine.
O.D. +1.25 D. Sph. ⊃ +0.50 D. Cyl. axis 90
O. S. +1.25 D. Sph. ⊃ +0.50 D. Cyl. axis 90
An examination was made and certain orthoptic techniques were applied by the optometrist McCulloch who then prescribed the following corrections which gave complete relief from all symptoms.

Distance correction—
O.D. +0.75 D. Sph. ⊃ +0.50 D. Cyl. axis 90
O.S . +0.75 D. Sph. ⊃ +0.50 D. Cyl. axis 90

Reading correction—
O.D. +2.25 D. Sph. ⊃ +0.50 D. Cyl. axis 90 ⊃ 2△ Base-In

O. S. +2.25 D. Sph. ⌒ +0.50 D. Cyl. axis 90 ⌒ 2△ Base-In

Case Report No. 6

Marton reports the following case in the OPTICIAN, Vol. LXXXV, No. 2190, p. 73. Patient, boy, age 13. Two months before this patient visited the optometrist Marton, he had been examined by an oculist who had prescribed the following correction with the aid of homatropine. The correction did not relieve the symptoms.

O.D. +1.00 D. Sph. ⌒ +0.75 D. Cyl. axis 90
O. S. +1.00 D. Sph. ⌒ +0.75 D. Cyl. axis 90

Marton examined this case and kept the patient under observation for six weeks. During this period certain orthoptic measures were employed. At the end of this period Marton prescribed the following correction which gave immediate relief.

O.D. +4.00 D. Sph.
O. S. +4.00 D. Sph.

Case Report No. 7

Martin reports the following case in the AMERICAN JOURNAL OF OPTOMETRY, Vol. 3, No. 8, p. 242. Patient, male, age 50, who had suffered from incurable headaches for many years. All medical treatment without avail. Being in comfortable circumstances, he had consulted eminent oculists and physicians. At the time he consulted the optometrist Martin, he was wearing the following correction.

O.D. +1.50 D. Sph.
O. S. +1.50 D. Sph.

Martin's examinations disclosed a convergence insufficiency at the near-point and orthoptic treatments were given the patient for a short period of time. Martin then prescribed the following correction which gave lasting relief from the symptoms.

O.D. +2.25 D. Sph. ⌒ 1½△ Base-In
O. S. +2.25 D. Sph. ⌒ 1½△ Base-In

Case Report No. 8

Uhler reports the following case in the YEAR BOOK OF THE NEW YORK STATE OPTOMETRIC ASSOCIATION, 1933, p. 164. Patient, female, laundry worker, age 27. Complains of being very nervous, eyes pain at times and poor rest. Was being treated by her physician who claimed he could find nothing wrong with her and suggested a change of climate. The optometrist Uhler prescribed the following corrections for the patient which gave her complete relief.

Distance correction—
O.D. +1.25 D. Sph.
O. S. +1.25 D. Sph.

Reading and near-point correction—
O.D. +2.00 D. Sph.
O. S. +2.00 D. Sph.

Case Report No. 9

McCulloch reports the following case in the AMERICAN JOURNAL OF OPTOMETRY, Vol. 2, No. 12, p. 364. Patient, female, age 31. Occupation, silk spinner, demanding constant attention to very fine near-point work. Patient was suffering from terrific headaches and was wearing the following correction which was prescribed by an oculist under atropine.

O.D. +0.50 D. Cyl. axis 30
O. S. +0.50 D. Cyl. axis 150

An examination by the optometrist McCulloch disclosed six degrees of exophoria at the working distance. Correcting this with 3△ prism, base-in over each eye there was revealed a latent hyperopia of O.U. 1.50 diopters. McCulloch reports that under this technique the torsion disappeared and the cylinder axes reverted to their normal position, and the following corrections were prescribed.

Distance correction—
O.D. +0.50 D. Cyl. axis 180
O. S. +0.50 D. Cyl. axis 180

Reading correction—
O.D. +1.50 D. Sph. ⌒ +0.50 D. Cyl. axis 180 ⌒ 1½△ Base-In
O. S. +1.50 D. Sph. ⌒ +0.50 D. Cyl. axis 180 ⌒ 1½△ Base-In

One week later the patient called to report that headaches had ceased entirely and that "glasses" were fine.

Case Report No. 10

Calway reports the following case in the OPTICIAN, Vol. LXXVII, No. 1986, p. 165. Patient, female, age 37. Complained of difficulty doing near work. She was wearing the following correction as prescribed by an oculist under a cycloplegic a short time before.

O.D. +0.75 D. Sph.
O. S. +0.75 D. Sph.

The optometrist Calway examined the case and prescribed the following correction which relieved the condition.

O.D. +1.00 D. Sph.
O. S. +1.50 D. Sph.

Case Report No. 11

Kurtz reports the following case in the AMERICAN JOURNAL OF OPTOMETRY, Vol. 2, No. 11, p. 322. Patient, female, age 44, complained of frontal and temporal headaches and blurred vision. She was using the following correction which had been prescribed under a cycloplegic by an oculist.

O.D. +1.50 D. Sph.
O. S. +1.50 D. Sph.

An ocular examination by the optometrist Kurtz disclosed 16 degrees of esophoria which was corrected by orthoptic treatment and a hyperopia which required the following prescription to correct the ametropia, and relieve the symptoms.

O.D. +2.25 D. Sph.
O. S. +2.25 D. Sph.

Case Report No. 12

Anderson reports the following case in the OPTICIAN, Vol. LXXVII, No. 1979, pp. 26-27. Patient, female, age 34. Patient extremely nervous with a low visual acuity. Had been under the care of an oculist for five years without success. He had used a cycloplegic in examining her on several occasions but her visual condition did not improve when she used the glasses he prescribed. The optometrist Anderson examined the patient and prescribed the following corrections which completely relieved her visual condition.

Distance correction—
O.D. +1.50 D. Sph. ⌒ +0.75 D. Cyl. axis 135
O. S. +1.50 D. Sph. ⌒ +0.75 D. Cyl. axis 45

Reading correction—
O.D. +4.50 D. Sph. ⌒ +0.75 D. Cyl. axis 135 ⌒ ¾ △ Base-In
O. S. +4.50 D. Sph. ⌒ +0.75 D. Cyl. axis 45 ⌒ ¾ △ Base-In

Case Report No. 13

Neill reports the following case in the AMERICAN JOURNAL OF OPTOMETRY, Vol. 6, No. 2, p. 89. Patient, female, age 18. This young woman had experienced a great deal of discomfort trying to use the

following correction which had been prescribed by an oculist after using a cycloplegic in his examination of the case.

O.D. +3.25 D. Sph. ⌒ +1.75 D. Cyl. axis 90
O. S. +2.75 D. Sph. ⌒ +2.00 D. Cyl. axis 90

The optometrist Neill prescribed the following correction which gave complete comfort.

O.D. +4.00 D. Sph. ⌒ +3.00 D. Cyl. axis 90
O. S. +3.50 D. Sph. ⌒ +3.00 D. Cyl. axis 90

Case Report No. 14

Blackburn reports the following case in the OPTICIAN, Vol. XCVI, No. 2492, p. 380. Patient, male, age 56. Wanted to have his eyes examined but said that the optometrist would not have to bother with the right eye as an oculist had informed him it never would be any good. He was wearing the following correction as prescribed by this oculist.

O.D. Plano
O. S. +2.00 D. Sph.

The optometrist Blackburn refracted the case and prescribed the following correction, which after the first week was satisfactory, and which in time enabled him to use both eyes.

O.D. +6.25 D. Sph. ⌒ —0.75 D. Cyl. axis 180
O. S. +2.75 D. Sph.

Case Report No. 15

McCulloch reports the following case in the AMERICAN JOURNAL OF OPTOMETRY, Vol. 2, No. 12, p. 364. Patient, female, office worker complaining of headache and slowness in reading and focusing her eyes. Patient now using the following correction which had been prescribed by an oculist with the aid of a cycloplegic.

O.D. +0.25 D. Cyl. axis 90
O. S. +0.50 D. Cyl. axis 90

An examination by the optometrist McCulloch enabled him to prescribe the following correction.

O.D. +1.25 D. Cyl. axis 90 ⌒ 2△ Base-In
O. S. +2.00 D. Cyl. axis 90 ⌒ 2△ Base-In

McCulloch reports further that two weeks later a post-refraction revealed the fact that the patient had complete relief from headaches and a marked increase in the speed of her typing.

Case Report No. 16

Anderson reports the following case in the OPTICIAN, Vol. LXXVII, No. 1979, p. 26. Patient, male, age 34. Was troubled with chalazions and cysts of both upper lids which had to be operated on at intervals by an oculist. Patient was told by this oculist that he needed no glasses. The optometrist Anderson examined the patient and found considerable uncorrected hyperopia which he corrected with the following prescription which was worn constantly. The patient's lid disorders immediately disappeared.

O.D. +3.75 D. Sph. ⌒ 1△ Base-In
O. S. +3.75 D. Sph. ⌒ 1△ Base-In

Case Report No. 17

Baxter reports the following case in the AMERICAN JOURNAL OF OPTOMETRY, Vol. 7, No. 4, p. 218. Patient, housewife. Complained of severe pains in head and eyes, the pains sometimes extending to her neck and shoulders. Her nerves appeared to be in bad shape. The conjunctiva and ciliary zone were mildly congested. The patient complained of progressively losing both her sight and her health. She had recently been examined by two of the local oculists with no improvement in her condition. Her vision was corrected with the following lenses.

O.D. +3.00 D. Sph.
O. S. +3.00 D. Sph.

Several family physicians had also treated her without any marked improvement in her condition. An examination disclosed an accommodative problem and the optometrist Baxter prescribed orthoptic treatments and the following correction which gave the patient complete relief.

O.D. +4.25 D. Sph.
O. S. +4.25 D. Sph.

Case Report No. 18

Kurtz reports the following case in the NORTHWEST JOURNAL OF OPTOMETRY, Vol. 1, No. 10, p. 206. Patient, male, age 18, had consulted an oculist who had prescribed the following correction for reading and all near point work.

O.D. +0.75 D. Sph.
O. S. +0.75 D. Sph.

This correction failed to give relief and the patient consulted the op-

tometrist Kurtz who prescribed the following correction which gave complete relief from all symptoms.

O.D. +1.50 D. Sph.
O. S. +1.50 D. Sph.

Case Report No. 19

Doane reports the following case in the AMERICAN JOURNAL OF OPTOMETRY, Vol. 11, No. 10, p. 398. Patient, female, age 18, student. History: Generally good health. Patient had been given glasses when in high school. She discarded them because of discomfort. Her eyes were later examined by an oculist who said her trouble was caused by a muscular deficiency for which he could not give glasses. He had prescribed "drops." When first seen by the optometrist Doane, her symptoms were: Eyes water after reading 20 minutes. Often sees double: gets dizzy at movies and both dizziness and nausea after one hour of study. Marked discomfort when reading on train and frequent occipital headaches. Doane examined her eyes and found her somewhat hyperopic and suspected aniseikonia. A further examination of her eyes with an ophthalmo-eikonometer disclosed a difference in size in the ocular images. Doane then prescribed the following correction which gave complete comfort and relief from all symptoms.

O.D. +0.75 D. Sph. 1.50% meridional axis 90
O. S. +1.12 D. Sph.

Case Report No. 20

Morse-Peckham reports the following case in the CLINICAL REPORT OF THE OPTOMETRIC RESEARCH INSTITUTE, No. 5, p. 23, 1938. Patient, boy, age 8. Suffering from alternating squint. He was wearing the following correction that was prescribed by an oculist, without improving the condition. This correction had been used for three years and the patient had been instructed to continue its use.

O.D. +3.50 D. Sph.
O. S. +5.00 D. Sph.

The optometrist Morse-Peckham prescribed the following full hyperopic correction which in nine months completely eliminated the strabismus and gave the patient stereopsis at all distances.

O.D. +5.50 D. Sph. ⊂ 0.50 D. Cyl. axis 100
O. S. +7.00 D. Sph.

SUMMARY

From time to time the statement is made by some few oculists,

that in an eye examination, the action of the ciliary muscle should be abolished in order that the total error of refraction can be ascertained. These men suggest that "drops" or cycloplegics be used to accomplish this result. Homatropine is the drug usually suggested for this purpose.

The writer and others have already indicated the unreliability of action of this drug upon the ciliary muscle. Controlled tests, made under the most scientific conditions in physiological laboratories have indicated that the action of homatropine upon the ciliary muscle of the eye is entirely unpredictable. In some ocular cases most of the accommodative action is abolished when the drug is used. In others, but a portion is affected and in still other cases the drug seems to have no affect at all on the accommodative action. This has been proven without question of doubt. Because of this variability of action, how then, can accurate refractive findings be secured in the course of an eye examination when homatropine is used? Particularly when the examiner has no means of knowing whether or not he is getting a full, or a partial or perhaps no relaxation of the ciliary muscle at all, in the case thus being examined.

The clinical reports presented in this paper are all cases in which hyperopia is the refractive error to be corrected. These cases were all examined by oculists using "drops" as part of their examination techniques. This they did, no doubt, in an effort to fully relax the ciliary muscle. They used the drug in the hope, that by so doing, it would enable them to prescribe the maximum possible amount of convex lens for each case. As a matter of fact, as these clinical reports show, the use of the drug defeated the examiner in the very purpose he was trying to accomplish.

These cases all needed convex lenses, and all were finally given comfort by optometrists only after supplemental corrections containing more convex sphere were prescribed than was originally given the patient when the drug was used. Hyperopia is a refractive condition which is very prevalent and which as a rule should receive a full correction. The cases reported, indicate that this can best be accomplished, without using a refractive technique that includes the use of a cycloplegic.

CONCLUSIONS

1. The cases reviewed in this report, indicate that optometrists, regularly using as they do, customary examination procedures as universally employed in ocular examinations, are able, by means of these techniques, to prescribe for, and adequately correct cases of hyperopia.

2. The cases reviewed in this report, indicate that the use of cycloplegics or "drops" as used in ocular examinations in routine clinical practice by some oculists, fails in certain cases of hyperopia to produce sufficient relaxation of the accommodative processes. This failure therefore making it technically impossible for the examiner to prescribe maximum corrections which are frequently necessary in prescribing for and correcting hyperopia.

3. The cases reviewed in this report, indicate that the procedure employed by certain oculists in using cycloplegics or "drops" in ocular examinations does not make for infallibility of refractive examination techniques.

4. The cases reviewed in this report, indicate that the routine use of cycloplegics or "drops" in clinical refractive procedure should be discontinued.

Carel C. Koch.

BOOK NOTICES

DISEASES OF THE EYE. Charles H. May, M.D. Sixteenth Edition. Published by William Wood and Company. Baltimore, Md. 515 pages. Ill. $4. 1939.

This book probably holds the record in ophthalmic writings for the number and size of the editions through which it has run. It has been and will continue to be a classic in its field. Dealing as it does with the symptoms, etiology, pathology and treatment of all ocular disease, May gives to the reader all the facts as they are understood today in a brief, readable manner. The sixteenth edition has been revised where necessary and is a book which should find a place in the library of every practicing optometrist. T.O.B.

* * * * *

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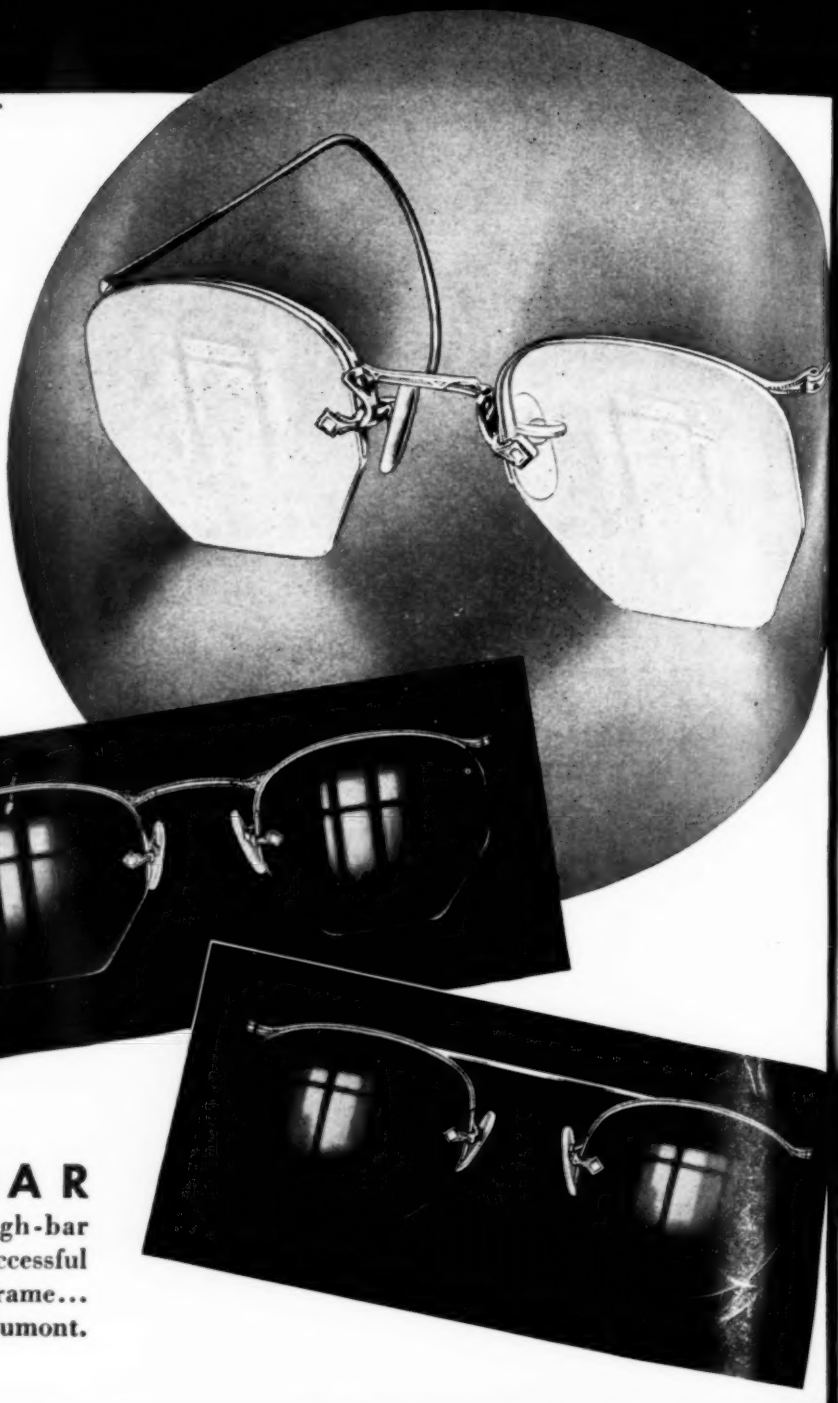

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